CURRICULUM FOR AGRICULTURAL ENGINEERS AND ECONOMISTS SPECIALIZING IN INFORMATICS SCIENCE. IS THIS A GOOD WAY TO TRAIN AGRI-INFORMATICS EXPERTS?

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Abstract

The Council of the University of Debrecen accepted the proposal to establish a five-year degree course in agri-informatics, in October 2001. This proposal had been accepted by the Ministry of Education, and we forwarded it to the Hungarian Accreditation Committee, which also accepted it. The course is run by the Agricultural Economics and Rural Development Faculty, the Agriculture Agronomy Faculty and the Institute of Mathematics and Informatics, from the Faculty of Arts and Sciences. This course was created to meet demand from the Hungarian agri-food sector, governmental offices and institutes, which all need a wide range of computerized tools and systems. Actual teaching will begin in the 2003/2004 school year. The percentage of computer sciences knowledge offered in this program is approximately 40 percent.

Keywords: computer science, curriculum, training, agri-informatics

1. Antecedent

Computer Science subjects have been taught to agricultural engineer students at the University of Debrecen, as well as in the former Agricultural University of Debrecen, since 1978. The curriculum and the content of subjects were changed many times over the last few terms. The education focused on giving students the tools and basic methods needed to use computers and communication equipment. The legal predecessor of our Faculty was the Institute of Agricultural Economics and Rural Development, founded in 2000, originally a part of the Faculty of Agriculture. The aim of the reorganization was to integrate agricultural economics and rural development as an independent unit into the structure of the University of Debrecen, and to strengthen the training in agribusiness; agricultural rural development; agricultural public administration; computing, statistics and business planning. The accreditation process resulted in the approval of the petition by the Government on May 14th 2002, and the Faculty of Agricultural Economics and Rural Development was established on September 1st 2002.

1.1. Demands

In the past few years, we have received feedback which made it clear that we have to integrate computer science across the structure of the curriculum. Our experience is based on our already existing informatics specializations, which started in 1995/1996. While the interest of students in our subjects has been growing, the agri-food sector has been increasingly in need of experts with a mixture of agricultural, economic and informatics knowledge.

1.2. Faculty competence

A degree course in agricultural informatics has never existed in Hungary before. The University of Debrecen is able to start and run such a course because the level of teaching and research potential is already high in the agricultural, economic, mathematics and informatics . The Department of Applied Business Management, coordinating mainly practical education, began operating in1983, as the Department of Management and Labour Science. Since 1999, it has functioned as the Department of Management Science and the Department of Labour Science, with new profiles and activities. In 1994, the Department of Finance and Accounting was founded, the Department of Agricultural Economics continued its activities from 1995, as the Department of Agricultural and General Economics and the Department of Marketing and Business. In the same year, the Department of Rural Development and Resource Management was founded. The Department of Economic Analysis and Statistics started to operate independently in 2000. The Department of Informatics and Applied Mathematics was founded by reorganization of the departmental structure in 1998, from 2002 it operates under a new name "Department of Business- and Agricultural Informatics " with new activities.

2. The curriculum

Based on our experience and demands, curriculum development was started in 2000, coordinated by the Department of Business and Agricultural Informatics. The curriculum consists of thee main parts: informatics , agricultural economics and engineering, complemented by general knowledge (e.g., social, languages).

2.1. Training aims

Our aim with this course is to train experts who are capable of developing and managing informatics systems for agricultural and related areas in our knowledge-based information society. Graduates have to be able to understand the real production, operation and business models, and they have to be able to make information models develop informatics systems, and run them. They should solve problems related to informatics and information systems using rapidly-developing computing and telecommunication tools. The ability to model, create or find suitable solution algorithms is also necessary. An important objective is for professionals to understand the agricultural, economic and administrative flows supported by informatics systems, and to corporate with experts from other areas. The university level degree course takes 5 years, the necessary total learning time is 9,000 hours (with 3,000 contact lesson hours) and the necessary credits are 300.

2.2. Main topics and its proportion

The percentages of subjects are the following: general knowledge 252 hours (8%), agricultural engineering 686 hours (23%), economics and law 742 hours (25%), computer science 728 hours (24%), specialized informatics knowledge 448 hours (15%), other knowledge 150 hours (5%). The credit value of the compulsory subjects is 241 credits, 45 credits come from the specialized informatics subjects, and 15 credits come from the other subjects.

2.3. Main topics and their credit value.

a. General knowledge

It gives general knowledge about social sciences (philosophy, agro-sociology), law, environmental knowledge, mathematics. The percentage of these subjects in the program is 5-10 %, which is a minimum 15 credits.

b. Agronomy knowledge

The main subjects are the following: Agricultural Zoology, Agricultural Botany, Agricultural Chemistry, Fundamentals of Agriculture and Food Industry, Basics of Soil Science, Natural Resources, Technology, Land Usage, Turf Management, Water and Environment Management, Nursery, Animal Husbandry, Plant Breeding, Animal Physiology and Hygiene, Plant Protection. These subjects make up 15-25 % of the total study hours, for a total of 45 credits.

c. Economics and related subjects

This group of subjects includes macro and micro-economics, agricultural economics, farm management, accounting, marketing, financial, organization and management. This knowledge forms the basis for using computer science in agriculture and rural development. The necessary time for these subjects makes up 15-25% of the total course duration, and its value is 45 credits.

d. Informatics and specialised informatics knowledge

This gives convertible informatics knowledge, which can be used in different areas in agriculture and rural development. The basic informatics knowledge is about 15-25 % of the total duration and gives 45 credits. The specialized subjects are eligible and 15-25% of the total credits. Students can choose orientation from the 7th semester. One of them is the economics and rural development and the other is the engineering and environmental orientation. Students have to have a minimum 35 credits from their specialized subject to graduate.

e. Other knowledge

Students can learn subjects in other programs of our or an other university. This percentage of such courses from other programs may make up 5-10% of the total study hours, or 15 credits. Summer practical work must total at least 300 hours.

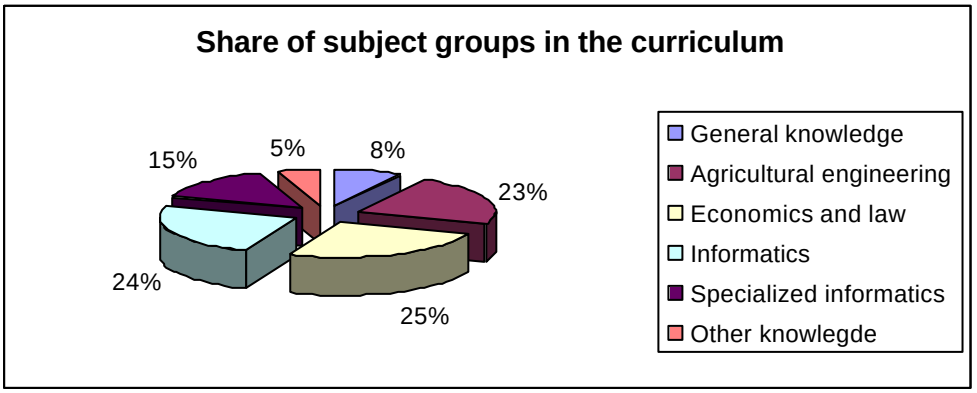

Figure 1.

Table 1.
Informatics subject in the curriculum for informatics agricultural engineer

Subjects	**Rate**	**Contact**	**Theory**	**Practice**	**Individual**	**Total**	**Credit**
d) Informatics	**24%**	**728**	**378**	**350**	**1456**	**2184**	**73**
d1. Information technology		98	42	56	196	**294**	10
d2. Database systems		98	42	56	196	**294**	10
d3. Communication networks		56	28	28	112	**168**	6
d4. Software development		84	42	42	168	**252**	8
d5. Infrastructure management		42	28	14	84	**126**	4
d6. Information system development		98	56	42	196	**294**	10
d7. GIS		84	28	56	168	**252**	8
d8. Expert systems		42	28	14	84	**126**	4
d9. Multimedia		56	28	28	112	**168**	6
d10. Internet		42	28	14	84	**126**	4
d11. Informatics in extension		28	28		56	**84**	3
e1) Specialised informatics knowledge	**15%**	**448**	**294**	**154**	**896**	**1344**	**45**
e1-1) Business and rural development orientation							
e1-1/1 Information management		28	14	14	56	**84**	3
e1-1/2 Management Information systems		28	28		56	**84**	3
e1-1/3 Integrated Information Systems		28	28		56	**84**	3
e1-1/4 Farm applications		28	28		56	**84**	3
e1-1/5 Informatics in rural development		28	28		56	**84**	3
e1-1/6 Decision Support Systems		28	28		56	**84**	3
e1-1/7 Applications in Administration		28	28		56	**84**	3
e1-1/8 Accounting Systems		28	14	14	56	**84**	3
e1-1/9 e-Government		28	28		56	**84**	3
e1-1/10 EU information systems		28	28		56	**84**	3
e1-1/11 E-agribusiness		28	14	14	56	**84**	3
e1-1/12 e-Tourism		28	28		56	**84**	3
e1-1/13 Thesis		112		112	224	**336**	11
e1-2) Engineering and environmental orientation							
e1-2/1 Remote Sensing, Image processing		28	14	14	56	**84**	3
e1-2/2 Environment modelling		28	28		56	**84**	3
e1-2/3 Soil information system		28	28		56	**84**	3
e1-2/4 Precision Agriculture		28	28		56	**84**	3
e1-2/5 Computer Aided Design		28	14	14	56	**84**	3
e1-2/6 GIS in Machinery		28	28		56	**84**	3
e1-2/7 Crop modelling		28	14	14	56	**84**	3
e1-2/8 Informatics in Genetics		28	28		56	**84**	3
e1-2/9 Informatics in crop protection		28	28		56	**84**	3
e1-2/10 Informatics in animal breeding and health		28	28		56	**84**	3
e1-2/11 Automation and control		28	28		56	**84**	3
e1-2/12 Bio-informatics		28	28		56	**84**	3
e1-2/13 Thesis		112		112	224	**336**	11

3. Plans

We will launch the course in the 2003/2004 academic year with the modified curriculum based on the opinion of the Hungarian Accreditation Committee. We hope that it will help the development process and innovation in the agri-food sector and rural areas.

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